



The subject of this invention is a compact polluted-air filtration unit, that uses simple cassette filters and works under negative pressure or under pressure, enabling easy installation and removal of the filters as well as high and variable air flows.

There are filtration boxes with multiple filters mounted at the same time, with high air flow, as shown schematically in figure 1a of the attached drawings, but those box assemblies c-d and filters e have major disadvantages: firstly, they use filters e whose air intake f and outlet g chambers are attached to the filters (figures 1b and 1c).

Those filters, which include an intake chamber and an outlet chamber, are complex to manufacture and have a high production cost. Moreover, the cost of replacing such filters is very high for the user.

Moreover, the filters are hard to access, which most often requires specialized personnel because it is necessary to disconnect the inlet duct a-b, then disassemble part c from part d to reach the filters.

Lastly, these boxes require systems for assembling the two dismantlable parts of the box to compress the inlet and outlet joints of the filter chambers.

The purpose of this invention is to radically eliminate the disadvantages described above.

The subject of this invention is a compact polluted-air filtration unit that works under pressure or under negative pressure, enabling high flows, characterized by having several filters with no air intake or outlet chamber, situated on top of each other, each having an air inlet and outlet and each being connected to an air inlet and outlet collector that provides an equal distribution of the air to be treated among said filters.

Another subject of the invention is the embodiment of a compact filtration unit, characterized in that it is composed of two, appreciably identical, parts that are interleaved longitudinally into each other to form a whole, comprising lodging modules that are intended to receive cassette filters, each lodging module having a first chamber connected to a collector conduit bringing in the polluted air and a second chamber connected to a collector conduit for evacuation of the purified air.

The polluted-air filtration unit according to the invention is characterized also by the making of filters in single cassettes that have, for example, a gripping handle that is intended to be inserted into the filtration modules, said cassettes having at their periphery, on their air inlet and outlet faces, airtight joints to prevent any passage of air outside the filters.

The filtration unit according to the invention is also characterized by the fact that it uses cassettes that have no filter, i.e. that are obstructed to close up a part of the filtration modules and thus make it possible to vary the flow of the unit.

The polluted-air filtration unit according to the invention is characterized also by the fact that one of the assemblies that make up this unit can rise or descend by vertical movement to permit, firstly, the expansion of the space containing the filtration cassettes and thus facilitate their insertion or removal and, secondly, the narrowing of the space containing the filtration cassettes thereby compressing the joints of the filters thus assuring an airtight seal between the filters, their air inlet chamber and their air outlet chamber.

The movement of this assembly is controlled by means of a screw that acts on a frame that has small wheels that move over an inclined plane, thus causing the mobile assembly to go up or down.

Other characteristics of the invention will become apparent from reading the following description of one of its embodiments and by examining the attached drawings, in which:

- Figures 1a and 1c are diagrams showing the prior art and the problems that it causes.

The solution provided by the invention is shown in figures 2 to 5:

- Figure 2 is a frontal view in elevation of the filtration unit according to the invention, showing the two assemblies before interleaving.

- Figure 3 is a view of the assemblies in figure 2 interleaved into each other to form filtration modules.

- Figure 4 is a frontal view in elevation of the filtration unit with the filters installed.

- Figure 5 shows a cassette filter in a filtration module, on a larger scale.

By referring to figure 2, one can see that the filtration unit according to the invention is composed of two assemblies A-B that can be interleaved into each other to form an enclosure with, for example, six compartments.

Assembly A has a fixed base 1 placed on the floor. On one of its sides, there is a polluted-air conduit 2 that opens into a collector situated in its vertical frame 3. That frame 3 has a number of planes (for example, six in the example shown) forming balconies 4. Inside each of those balconies 4 is situated a chamber 5, open toward the top, in 5A, to enable the intake of polluted air toward the filter, which will be placed there subsequently. The second assembly B, which is intended to receive and direct the purified air toward the outlet of the unit, is mobile vertically to enable the installation, removal and tightening of the filters; like assembly A, it has

a number of balcony chambers 7 that can be inserted into those of assembly A. Each of those balconies 7 has, on either side, suspended runners 8 that are meant to receive the filters; it also has a chamber 9 that is open toward the bottom, in 9A, to enable the outlet of the purified air that has passed through the filter. The assembly of the chambers 8 opens into a collecting enclosure 10, which has an outlet 11.

By referring to figure 3, which shows the two assemblies A and B interleaved into each other, we see that the planes 4 and 7 of each of them form cavities 12, which are meant to receive the filters. Those cavities, which are called filtration modules 12, are six in number in the example shown. In each of them, at the bottom (in 5A), there is the polluted-air intake and at the top (in 9A) the filtered-air outlet. In figure 3, the assembly is raised to permit the insertion of the cassette filters.

Figure 4 shows the filtration unit of figure 3 with the cassette filters 13 in their lodging 12, which is called a filtration module. Figure 5 shows such a filtration module on a larger scale with the cassette filter.

As shown in these figures, the cassette filter 13 is in the form of a parallelepiped made of plastic, for example, inside of which there are one or more filtering elements, open at the top and bottom for the passage of air. That cassette 13 has, above and below, airtight peripheral joints 14. Said cassette also has a gripping handle 15. As shown in figures 4 and 5, each filtration module 12 receives a cassette filter 13. The assembly B is moved back downward, which has the effect of lowering the balcony chambers, which press on the joints 14 of that cassette, thus providing a perfect airtight seal between the filters and the air intake and outlet chambers.

To enable assembly B to move vertically, it is mounted on a frame that has small wheels, each of which rests on a mobile inclined plane pulled or pushed by a threaded rod 16, thus causing the assembly to move vertically.

To vary the flow of the filtration unit, according to the invention, one or more filtration modules are taken out of service. To do that, we use an obstructed cassette similar to cassette filter 13, but it is closed on both of its faces. The polluted air to be treated is distributed also among the filtration modules by suction or pressure—as the unit operates under negative pressure or under pressure—and is either recycled or released into the atmosphere. Such an installation can enable a high flow of air because you can add filtering modules if you want to increase the air-treatment capacity of the unit.